WHAT IS CLAIMED IS:

1. A flowmeter, comprising:

a resistive heater to be inserted into a fluid;

Alternating Current (AC) power with a first frequency to periodically heat the resistive heater;

a signal processing unit for detecting a first signal generated in the resistive heater in relation to a temperature variation of the resistive heater by the AC power, and obtaining a phase lag of the first signal relative to the heat generation in the resistive heater; and

an operation unit for calculating a flow rate of the fluid based on the obtained phage lag.

2. The flowmeter according to claim 1, further comprising a first detecting unit for detecting a voltage signal from the resistive heater,

wherein the signal processing unit detects the first signal from an output signal of the first detecting unit.

3. The flowmeter according to claim 2, further comprising:

a variable resistor placed on a supply path of the AC power and set for the same resistance value as that of the resistive heater; and

a second detecting unit for detecting a voltage signal from the variable resistor;

wherein the signal processing unit detects the first signal based on a signal obtained by subtracting an output signal of the second detecting unit from the output signal of the first detecting unit.

4. The flowmeter according to claim 1, wherein the first signal has a second frequency, which is two or three times as large as the first frequency of the AC power.

5. The flowmeter according to claim 1, wherein the resistive heater is a metallic or semiconductor material.

6. The flowmeter according to claim 1, wherein the operation unit comprises:

a memory unit for storing phase lag data between the first signal and the heat generation in the resistive heater and flow rate data corresponding to the phase lag data, which are mapped to each other; and

a microprocessor for calculating the flow rate of the fluid based on a correspondence between the obtained phase lag data of the first signal and the data stored in the memory unit.

7. The flowmeter according to claim 6, wherein the microprocessor controls the frequency of the AC power.

8. The flowmeter according to claim 1, wherein the signal processing unit comprises a lock-in amplifier.

9. A method of mapping phase lags to flow rates, comprising the steps of:

a) providing a resistive heater in fluid moving at a predetermined flow rate;

b) supplying AC power with a first frequency to the resistive heater;

c) detecting a first signal which is related to a temperature variation of the resistive heater;

d) obtaining a phase lag of the first signal relative to the heat generation in the resistive heater;

e) measuring the flow rate of the fluid;

f) repeating the steps b) to e) while varying the flow rate of the fluid; and

g) mapping measured flow rates of the fluid to phase lags of the first signal.

10. The mapping method according to claim 9, further comprising a step of repeating the steps b) to f) while varying the first frequency.

11. The mapping method according to claim 9, wherein the first signal has a second frequency, which is two or three times as large as the first frequency.